REMARKS

Pending Claims

After entry of the claim amendments, claims 4-20, 22-27, 29, 31, and 32-34 are pending.

Discussion of Claim Amendments

Claims 6, 29, 31, and 32 have been amended to further sharpen the claim language. Amended claim 6 is supported by the specification, e.g., at page 12, line 24 to page 13, line 7. New claims 33-34 have been added. Original claim 28 has been rewritten as composition claim 33. New claim 34 corresponds to canceled claim 30. No new matter has been added by way of these amendments.

Summary of Office Action

The Office Action states that the Advisory Action mailed May 9, 2005 has been vacated. The Advisory Action was accompanied by a signed Form PTO-1449. Applicants wish to note that, while the comments of the Advisory Action remain vacated, the signed Form PTO-1449 remains of record, and has not been, and should not be, vacated.

Claims 4-7, 20 and 28-32 stand rejected under 35 U.S.C. §102(b), as allegedly anticipated by U.S. Patent 3,979,198 (Bardsley), U.S. Patent 3,119,683 (Kealy et al.), and U.S. Patent 2,955,930 (Kealy). Claims 4-8, 20, 22, and 28-32 stand rejected under 35 U.S.C. §102(b), as allegedly anticipated by U.S. Patent 5,174,804 (Rehberg et al.), and EP 0968980.

Claims 4-13 and 23-32 stand rejected under 35 U.S.C. §103(a), as allegedly unpatentable over Bardsley, Kealy et al., Kealy, Rehberg et al., or EP 0968980 in view of U.S. Patent 4,025,329 (Goertz et al.), U.S. Patent 3,205,061 (Mason), and U.S. Patent Re 27238 (Stansbury et al.).

Applicants acknowledge, with appreciation, the indication that claims 14-19 are allowable. Reconsideration of the rejections is respectfully requested in view of the following.

Discussion of Anticipation Rejections

The Office Action rejects claims 4-8, 20, 22, and 28-32 as allegedly anticipated by the above listed references. Applicants respectfully traverse the rejection. A reference

anticipates a claimed invention only if it discloses each and every element of the claimed invention. To anticipate, in terms of 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference. *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 677, 7 USPQ2d 1315, 1317 (Fed. Cir. 1988). However, none of the cited references discloses each and every element of the present claims. For example, none of the references discloses a fertilizer having a ratio of sparingly water-soluble phosphatic fertilizer in conversion to P_2O_5 to a urea/aliphatic aldehyde condensation product ranging from 0.01 to 5 weight percent.

The Office Action points to Table V and Table I of Bardsley as disclosing a fertilizer containing urea/formaldehyde and phosphates. Bardsley is completely silent about a ratio of sparingly water-soluble phosphatic fertilizer in conversion to P_2O_5 to a urea/aliphatic aldehyde condensation product. There is no inherency. To support an anticipation rejection based on inherency, an examiner must provide factual and technical grounds establishing that the inherent feature necessarily flows from the teachings of the prior art. See *Ex parte Levy*, 17 USPQ2d 1461 (Bd. Pat. App. & Int. 1990). See also *In re Oelrich*, 666 F.2d 578, 21 USPQ 323 (CCPA 1981) (holding that inherency must flow as a necessary conclusion from the prior art, not a possible one). The Office Action has failed to provide factual and technical basis for inherency.

Even assuming, *arguendo*, that Bardsley inherently discloses a ratio of sparingly water-soluble phosphatic fertilizer in conversion to P_2O_5 to a urea/aliphatic aldehyde condensation product, as discussed in the previous Response to Office Action filed on April 4, 2005, the composition disclosed in Table V has a ratio of potassium metaphosphate in conversion to P_2O_5 to urea-formaldehyde of 13.75 weight percent, which is clearly outside the claimed ratio in weight percent. Therefore, there is no anticipation.

The fertilizer described in Table I contains 3-4% diammonium phosphate, 1-2% potassium meta phosphate, 6-8% granular urea formaldehyde, and 4-5% pulverized urea formaldehyde. There is no teaching in Bardsley that only the sparingly soluble potassium meta phosphate should be considered for calculating a ratio. There is no disclosure of a range of ratios. Bardsley only teaches a range for the amount of diammonium phosphate and potassium meta phosphate, and a preferred amount for each one. There is therefore no inherency.

Nevertheless, taking the preferred amount of potassium meta phosphate, which is 1.00%, the ratio of sparingly water-soluble phosphatic fertilizer in conversion to P_2O_5 to a urea/aliphatic aldehyde condensation product is calculated as follows. Potassium meta phosphate has a P_2O_5 content of 55%. The preferred amounts of the urea formaldehyde components are 6% and 4%, for a total of 10%. Thus, the ratio is (1x0.55/10) x 100 = 5.5%. This percentage is clearly outside the claimed range of ratio (of 0.01 to 5 percent). Thus, there is no anticipation.

Certain ranges of potassium meta phosphate and urea formaldehyde products are also given in Table I. But these ranges do not anticipate the claimed invention because the disclosure fails to meet the legal requirements of an anticipatory reference. To show anticipation, the prior art must provide a certain degree of specificity. Here, there is no specificity.

Upon a fair reading of Table I, those of ordinary skill in the art would read Table I to teach that if the amount of potassium meta phosphate is 1% (the preferred), then the total amount of the urea formaldehyde products should be 10% total, thereby yielding a ratio of 5.5%. If the amount of potassium meta phosphate is 2%, then the total amount of urea formaldehyde products can be (8+5) = 13% or (6+4) = 10%. Assuming that the mixture contains 2% potassium meta phosphate and 13% total urea formaldehyde condensation product, the ratio of sparingly water-soluble phosphatic fertilizer in conversion to P_2O_5 to a urea/aliphatic aldehyde condensation products is (2x0.55/13) x 100 = 8.46%, which is outside the claimed range; or if a combination is made so as to include 2% potassium meta phosphate and 10% total urea formaldehyde condensation product, then the ratio would be (2x0.55/10) x 100 = 11%, which is also outside the claimed range. In view of the foregoing, applicants respectfully submit that Bardsley fails to anticipate the present claims and the rejection should be withdrawn. Bardsley also fails to disclose the invention of claims 33-34. Bardsley fails to disclose a composition comprising a water-repellent substance.

The Office Action points to claims 7, 9, and 12 of Rehberg et al. in its rejection. However, claims 7, 9, and 12 of Rehberg et al. do not disclose the presently recited fertilizer having a ratio of sparingly water-soluble phosphatic fertilizer in conversion to P_2O_5 to a urea/aliphatic aldehyde condensation product ranging from 0.01 to 5 weight percent. Even if independent claim 7 encompasses an example in the application, which applicants do not concede, Example 1 is the only instance in Rehberg et al. describing the relative amounts of

dicalcium phosphate with a urea/aliphatic aldehyde condensation product, i.e., isobutylidene diurea. The fertilizer in Example 1 is a 14-3-3 fertilizer containing 14% nitrogen component and 3% P_2O_5 component by weight. Since isobutylidene diurea has a nitrogen content of 31% (see attached copy of "Characteristics of Nitrogen (N) Fertilizers", Colorado State University, placed on the Internet on October 15, 1996), the 14-3-3 fertilizer contains 45.2% isobutylidene diurea (14%/0.31). Thus, the composition of Rehberg et al. has a ratio of dicalcium phosphate in conversion to P_2O_5 to isobutylidene diurea of 6.6 weight percent (3/45.2 x 100%), which is outside the claimed ratio. Accordingly, Rehberg et al. fails to anticipate the present claims, and the rejection should be withdrawn.

The Office Action points to the abstract and claims 4, 5, 8, 16, and 17 in EP 0968980. However, the abstract and claims 4, 5, 8, 16, and 17 of EP '980 do not disclose the relative amounts of any of the components, let alone a fertilizer comprising sparingly water-soluble phosphatic fertilizer in conversion to P_2O_5 to a urea/aliphatic aldehyde condensation product ratio ranging from 0.01 to 5 weight percent. There is no inherency. The Office Action has failed to make a prima facie case for anticipation. Inherency cannot be justified by probabilities and possibilities. The Office Action must provide factual and technical basis to show that the missing descriptive is necessarily present in the reference.

EP '980 describes in its Preparation Examples 1-3, the use of ammonium hydrogen phosphate, which is known to those skilled in the art as a phosphate that is not sparingly soluble in water. Thus, EP '980 fails to disclose a composition employing a sparingly water-soluble phosphatic fertilizer. Accordingly, EP '980 fails to anticipate the present claims and the rejection should be withdrawn.

The Office Action fails to identify any portion of Kealy et al. that discloses a fertilizer having a ratio of sparingly water-soluble phosphatic fertilizer in conversion to P_2O_5 to a urea/aliphatic aldehyde condensation product ranging from 0.01 to 5 weight percent. The Office Action points to col. 3, lines 60-65 of Kealy et al., but this portion of the specification does not disclose the relative amounts of any of the components. Kealy et al. does disclose the relative amounts of various components in the examples; however, there is no anticipation. The composition in Example I contains 3.85% water-insoluble nitrogen in the form of urea-formaldehyde condensation product and 6.6% P_2O_5. Since urea formaldehyde condensation product contains about 38% nitrogen (See Rehberg et al., col. 12, lines 18-19), the composition in Example I contains 10.13% urea-formaldehyde condensation product

(3.85%/0.38). Thus, the ratio of sparingly water-soluble phosphatic fertilizer in conversion to P_2O_5 to a urea-formaldehyde is 65 weight percent in Example I, which is greater than the claimed ratio. The composition in Example II contains 12.9% sparingly water soluble phosphate in conversion to P_2O_5 and 3.00% water-insoluble nitrogen in the form of urea-formaldehyde condensation product, for a total of 7.9% urea-formaldehyde condensation product (3%/0.38). Thus, the ratio of superphosphate in conversion to P_2O_5 to ureaform polymer is 163 %, which is also greater than the claimed ratio. Example III fails to provide the information required to calculate the ratio. Accordingly, Kealy et al. fails to anticipate the present claims and the rejection should be withdrawn.

The Office Action points to col. 14, lines 25+ and claim 5 of Kealy. However, these portions of Kealy, or any other portion of the cited reference for that matter, fail to disclose a fertilizer having a ratio of sparingly water-soluble phosphatic fertilizer in conversion to P_2O_5 to a urea/aliphatic aldehyde condensation product ranging from 0.01 to 5 weight percent. For example, the composition in Example I is prepared from 1000 lbs of superphosphate and only 211 lbs of urea and 82 lbs of formaldehyde (37% x 222 lbs formaldehyde solution). The amount of water-insoluble nitrogen in the form of urea-formaldehyde condensation product is 3.9%, which corresponds to 10.26% of urea-formaldehyde condensation product. The weight percent of superphosphate in Example I is 50.6%, which is 8.86% in conversion to P_2O_5 (50.6%x0.175). Thus, the ratio in Example I is 86%, which is clearly outside the claimed ratio. Accordingly, Kealy fails to anticipate claims 4-8, 20, 22, 29, 31, and 32, and the rejection should be withdrawn.

As the cited references fail to disclose each and every element of the present claims, applicants submit that the anticipation rejections are not erroneous and should be withdrawn.

Discussion of Obviousness Rejections

Applicants respectfully submit that the Office Action has failed to make a *prima facie* case for obviousness. In order to establish a *prima facie* case of obviousness, the prior art references must teach or suggest all of the claim limitations. See *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970) ("All words in a claim must be considered in judging the patentability of that claim against the prior art.").

As discussed in regards to the anticipation rejections, Bardsley, Rehberg et al., EP '980, Kealy et al., and Kealy fail to disclose a fertilizer having a ratio of sparingly water-

soluble phosphatic fertilizer in conversion to P_2O_5 to a urea/aliphatic aldehyde condensation product ranging from 0.01 to 5 weight percent as required by claims 4-8, 20, 22, 29, 31, and 32. Moreover, neither Goertz et al., Mason, nor Stansbury et al. discloses the recited ratio. These additional references, however, do not cure the deficiency of the primary references.

Moreover, the Office Action fails to set forth any motivation for making changes to the fertilizer compositions disclosed therein which would be necessary to arrive at the claimed invention. To justify an obviousness rejection, motivation to modify the prior art must be found in the cited references. The motivation to modify the prior art must flow from some teaching in the art that suggests the desirability or incentive to make the modification needed to arrive at the claimed invention. *Alza Corp. v. Mylan Laboratories Inc.*, 391 F.3d 1365 (Fed. Cir. 2004). See also *In re Napier*, 55 F.3d 610, 34 USPQ2d 1782 (Fed. Cir. 1995).

Here, there is no suggestion or motivation to modify the references in such a way as to arrive at a fertilizer having a ratio of sparingly water-soluble phosphatic fertilizer in conversion to P_2O_5 to a urea/aliphatic aldehyde condensation product ranging from 0.01 to 5 weight percent. As discussed, Bardsley et al. discloses fertilizers having a ratio outside of the claimed range. Rehberg et al. discloses fertilizers having ratio 6.6 to 89 weight % (Examples 1 and 6). EP '980 discloses a fertilizer having a phosphate which, in Preparation Examples, is not a sparingly water-soluble phosphate. Kealy et al. and Kealy disclose fertilizers having a ratio of 65 to 163 weight % (Examples I and II of Kealy et al. and Example I of Kealy). There is no iota of teaching, hint or pointer in these references to motivate those of ordinary skill in the art to select a weight ratio which falls outside of all ratios taught in the art. Motivation to select a smaller ratio cannot be justified when the ratios calculated from the disclosure of the references are larger. The mere fact that the prior art could have been so modified would not make the modification obvious unless the prior art suggested the desirability of the modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Those of ordinary skill in the art would not be motivated to modify the cited references, except only with improper hindsight using applicants' invention as a roadmap to pick and choose elements from the prior art to arrive at the claimed invention. As the Federal Circuit has stated, "combining prior art references without evidence of such a suggestion, teaching or motivation simply takes the inventor's disclosure as a blueprint for piecing

together the prior art to defeat patentability – the essence of hindsight." *In re Demiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999).

Moreover, the cited references, by teaching large ratios, teach away from the claimed composition containing a low ratio of 0.01 to 5 weight %. The Federal Circuit has repeatedly recognized that proceeding contrary to the accepted wisdom in the art represents "strong evidence of unobviousness". *In re Hedges*, 783 F.2d 1038, 1041, 228 USPQ 685, 687 (Fed. Cir. 1986); *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1552, 220 USPQ 303, 312 (Fed. Cir. 1983).

Even if motivation to modify is found, which applicants respectfully submit that this cannot be the case here, the obviousness inquiry does not stop there. The art must provide the required expectation of success. Both the suggestion and the expectation of success must be found in the prior art, not in applicants' disclosure. *See, In re Dow Chem. Co.*, 837 F.2d 469, 5 USPD2d 1529 (Fed. Cir. 1988). Obvious to try is not a proper basis for justifying a showing of the required expectation of success. Moreover, the cited references fail to recognize the result effective variable; i.e., the cited references fail to recognize the importance of the ratio of phosphate (as P_2O_5) to urea formaldehyde.

In view of all of the foregoing, applicants respectfully submit that the obviousness rejection of the claims is erroneous and should be withdrawn. Claims 33-34 are also patentable over the cited references.

Conclusion

A favorable decision is solicited. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

Xavier Pillai, Ph.D., Reg. No. 39,799
LEYDIG, VOIT & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson Avenue
Chicago, Illinois 60601-6780
(312) 616-5600 (telephone)
(312) 616-5700 (facsimile)

Date: September 29, 2005

Colorado State University Cooperative Extension

TRI RIVER AREA

Mesa County • Delta County • Montrose County • Ouray County

Characteristics of Nitrogen (N) Fertilizers

Curtis E. Swift, Ph.D., Area Extension Agent (Horticulture)
Colorado State University Cooperative Extension
Tri River Area

Fertilizer Name	Analysis	Source of N	Moisture Dependence	Low Temperature Response	Residual N Activity	Salt index (per N unit)
Quickly Available						
Ammonium-nitrate	33-0-0	ammonium nitrate	minimal	rapid	4-6 weeks	3.2
Ammonium-sulfate	21-0-0	ammonium sulfate	minimal	rapid	4-6 weeks	3.3
Ammonium-phosphate	18-46-0	diammonium phosphate	minimal	rapid	4-6 weeks	1.6
Urea	46-0-0	urea	minimal	rapid	4/6 weeks	1.6
Slow-Release						
Sulfur-coated urea	22-38% N	urea	moderate	moderately rapid	10-15 weeks	not applicat
ONCE	24-25% N	urea, nitrate, ammonium nitrate	moderate	moderately rapid	15-38 weeks	not applicat
Slowly-soluble						
IBDU	31-0-0	isobutylidine diurea	high	moderately rapid	10-16 weeks	0.2
Ureaform reaction						
Nitroform	38-0-0	ureaformaldehyde	high	slow	10-30 weeks+	0.3
FLUF	18-0-0	urea/ureaformaldehyde	moderate	medium	6-10 weeks	not applicat
Nutralene	40-0-0	methylene ureas	moderate	medium	7-12 weeks	not applicat
Methylene	39-0-0	methylene ureas	moderate	medium	7-9	0.7

urea					weeks	
Coron	28-0-0	urea/methylene ureas	minimal	moderately rapid	7-9 weeks	not applicat
N-Sure	28-0-0	triazone/urea sol.	minimal	moderately rapid	6-9 weeks	not applicat
Natural Organic fertilizers						
Ringers	6-1-3	blood, bone, seed meals	high	medium	10-12 weeks	0.7
Sustaine	5-2-4	composted turkey waste	high	medium	10-12 weeks	0.7
Milorganite	6-2-0	activated sludge	high	slow	10-12 weeks	0.7

Notes:

Moisture Dependence

Fertilizers that solubilize slowly need more water to get them into solution than highly soluble fertilizers. If water availability is a problem the use of a more soluble fertilizer would be advised.

Low Temperature Response

The term `Low Temperature Response' refers to the degree upon which a fertilizer is dependent on microbial activity for decomposition and nutrient release. This process is slow below 41° Fahrenheit (5° C) and above 104° Fahrenheit (40° C). The optimum temperature for this microbial process to take place is around 67° to 74° Fahrenheit (30° to 35° C).

In the table rapid release at a low temperature indicates the fertilizer is not dependent on microbial breakdown.

Residual Nitrogen (N) Activity

The Residual Nitrogen Activity is a measure of how long an application of fertilizer will provide the plant the needed nutrient(s). In general, quickly available (water-soluble) materials will have a short residual activity, while less-soluble and/or temperature-dependent materials will provide a longer N residual activity.

Salt Index

Water **soluble salts** can damage a plant when in excess of that plant's **salt tolerance**. Soluble salts on leaves can kill leaf tissue, and when in excessive amounts in the soil,can kill roots.

The salt concentration in the soil-water solution varies depending on the parent material(s) the soil evolved from, the **organic amendment** added, and the fertilizer used. Fertilizers are classed by their salt index. This is a measure of the fertilizer's effect on the salt level in the soil solution and is used to compute the solubilities of chemical compounds used as fertilizers.

Materials with high salt indexes cause plants to wilt or die because of the compounds' high affinity for water and the dehydration of the plant tissue. The lower the salt index, the less risk of plant injury.

Leaching Potential

The extent to which nutrients are transported down through the soil profile varies considerably. Climate, soil type, and the type and quantity of nutrients present in the soil in the soluble form determine the rate and amount of leaching. The greater the leaching potential of a fertilizer product, greater care is necessary when the material is used on sandy soil as ground water contamination is more likely. On very sandy soils and areas where ground water contamination is likely, the use of less soluble (greater moisture dependent) fertilizers is recommended.

Types of Materials:

Urea - $[CO(NH_2)_2]$ - Synthesized from ammonia and carbon dioxide under high temperature and pressure. Urea usually contains no less than 45% nitrogen.

Sulfur-coated urea - A controlled-release nitrogen fertilizer consisting of urea particles coated with sulfur. The product is usually further coated with a sealant. SCU typically contains about 30% to 40% nitrogen and 10% to 30% sulfur.

IBDU (Isobutylidene diurea) - A product of isobutryaldehyde and urea with a minimum total nitrogen content of 30%. IBDU is a slowly available nitrogen source by virture of particle size.

Urea-formaldehyde Reaction Products - (Urea Form) - A class of synthetic insoluble nitrogenous materials slowly available to plants. These products result

from a specific reaction of urea and formaldehyde resulting in a slow-release product.

Natural Organic Fertilizers are products that are plant- or animal-derived.

Excerpted in part from Turfgrass Management - Master Gardener Training (1995)
by Dr. Tony Koski, CSU Cooperative Extension

References used:

Mengel, K. & E.A. Kirby. 1982. Principles of Plant Nutrition - 3rd Edition. International Potash Institute, Bern Switzerland

Paul, E.A. & F.E. Clark. 1988. Soil Microbiology and Biochemistry. Academic Press, Inc.

Farm Chemicals Handbook 1996. Meister Publishing Company.

Place on the Internet October 15, 1996
Last updated:01/04/2003 22:23:14

Comments should be addressed to Dr. Curtis E. Swift, Area Extension Agent, Horticulture
Colorado State Cooperative Extension
2775 US Hwy 50, Grand Junction, CO. 81503
voice: 970-244-1834
fax: 970-244-1700